

Selection guide

Packing HiScale, XK, and Tricorn chromatography columns with Cytiva Capto and MabSelect resins



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Introduction

To obtain optimal performance during your protein purification, it is critical to use well-packed columns. For an optimal column packing, there are several parameters that need to be controlled during packing. These packing parameters are specific to the resin, and the type and dimension of the column that needs to be packed.

This guide summarizes parameters for packing small-scale HiScale™, XK, and Tricorn™ columns with Capto™ and MabSelect™ resins from Cytiva.

Impact of column packing on results and efficiency

The way that liquid flows through a chromatography column depends on how it is packed. A well-packed bed generates a stable column that offers good resolution. An even flow of liquid through the column will generate peaks that are narrow and sharp, as shown in Fig 1B.

A poorly packed bed generates an uneven flow through the column. Peaks will be broad, as shown in Fig 2B.

A well-packed column ensures reproducible column performance run after run. When liquid moves unevenly through the column, protein peaks will be broad and might overlap with other neighboring peaks. Therefore, the purity of the target protein could be negatively impacted when using a poorly packed column.

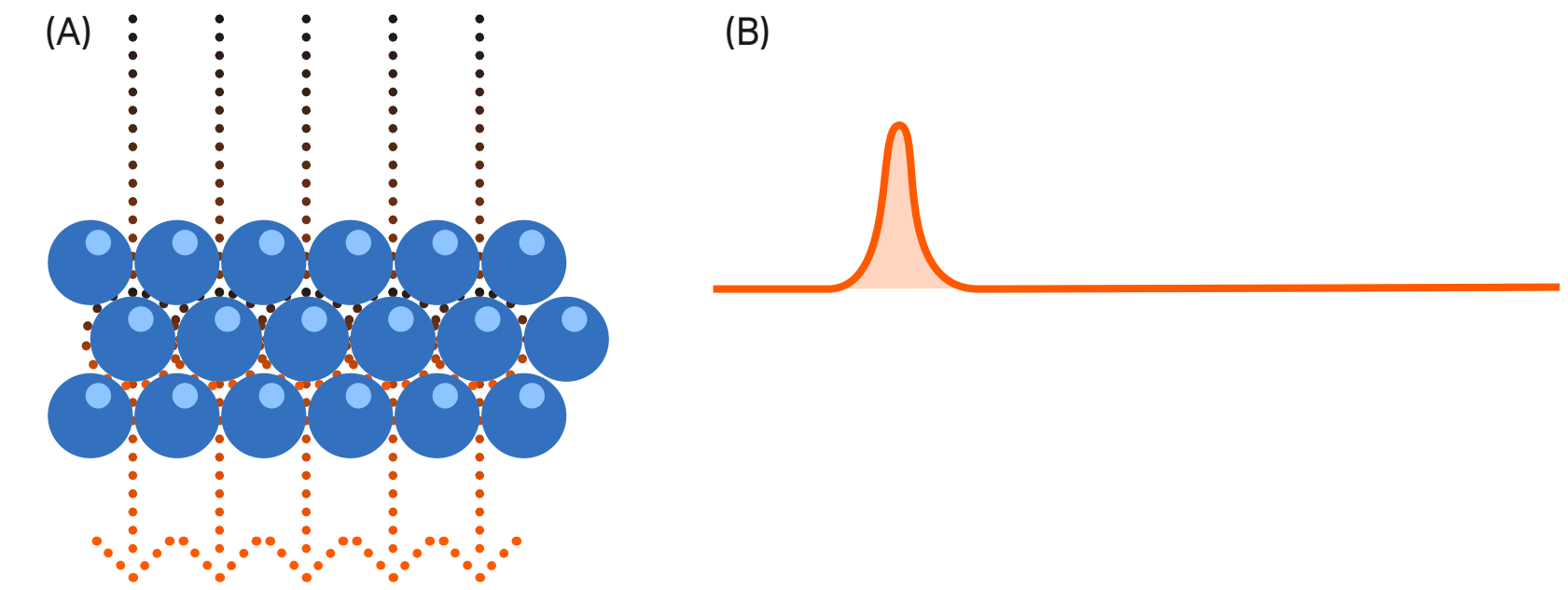


Fig 1. Consequence of a well packed resin bed: (A) Even flow of liquid; (B) Narrow and sharp peaks on the chromatogram.

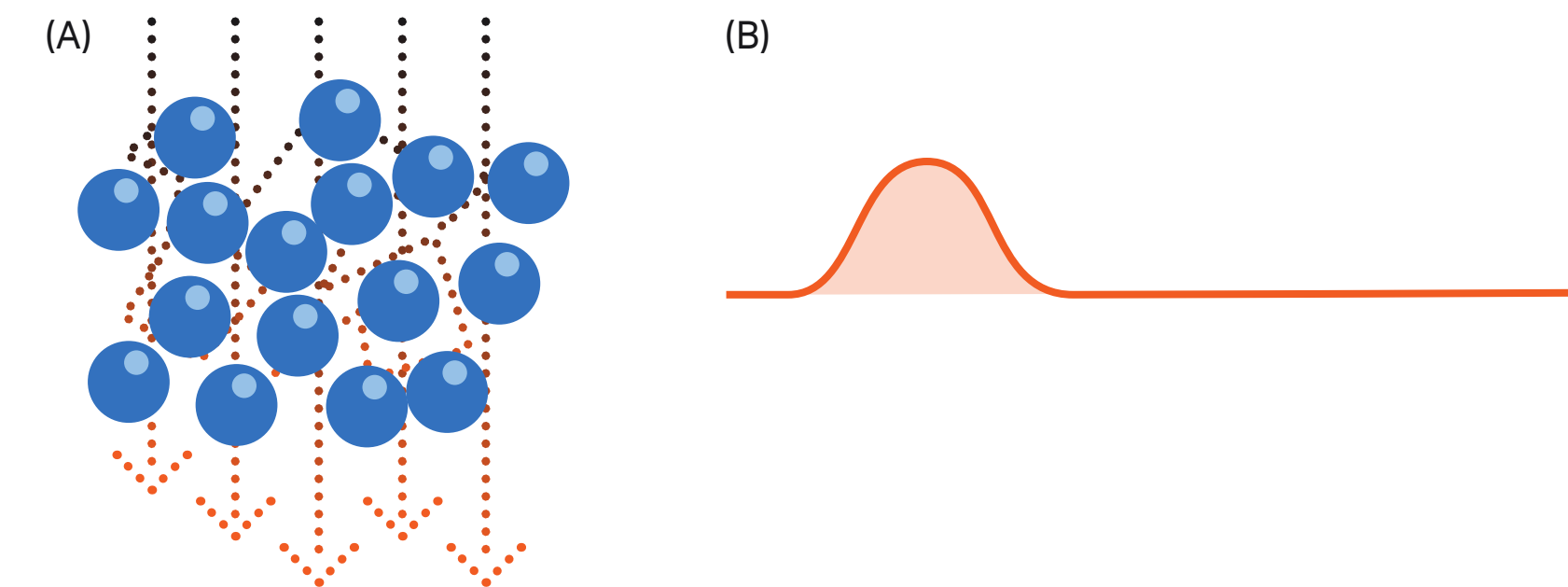


Fig 2. Consequence of a poorly packed resin bed: (A) Uneven flow of liquid; (B) Broad peaks on the chromatogram.

Terminology used in the guide

Slurry concentration

The slurry concentration is used to facilitate the calculation of the amount of resin needed to pack a certain bed height. For successful packing, different resins require different slurry concentrations. To determine the slurry concentration, we recommend that you use the [Slurry Concentration Kit](#). You can also watch our video [Column packing tutorial: Determining slurry concentration using a slurry kit](#).

Other methods involving centrifugation and sedimentation are also possible to use.

Note: The level of accuracy for determining the [slurry concentration](#) is not as critical as it is when packing large-scale columns. Small-scale columns may be packed with an excess of resin, which is removed after packing.

Compression

Depending on the column type and resin, the compression may be performed in two different ways:

- Mechanical compression with packing factor: after applying the settling flow, note the height of the consolidated bed before stopping the flow (after the flow is stopped the bed can slightly expand). The final bed height is calculated by dividing the consolidated bed height with the packing factor (PF):
Final bed height = Consolidated bed height/packing factor (PF)
Set the adapter against the consolidated packed bed, tighten the O-ring, and turn the end cap down until the calculated final bed height is reached
- Flow compression: after applying the packing flow, the adapter is moved a specific distance (mm) into the packed bed to avoid gap formation

Custom Design Media (CDM) group

If the chromatography resin you require is not part of our standard product offering, our specialists can custom design your chromatography resin from an appropriate base matrix and ligand.

Please note that CDM products are not supplied with instruction manuals.

Planning to scale up?

If you are working in process development and intend to scale-up, consider from the start the bed heights and flow rates that you will require at larger scales.

For consistent results when scaling up, we recommend that you keep residence time and/or bed heights constant.

Also, please note these packing methods are adapted to small-scale columns (< 5 cm i.d.) and are not always scalable to large-scale columns. If you need to scale-up, refer to the [packing recommendations](#) for large-scale Axichrom™, BPG, and Chromaflo™ columns.

Column packing recommendations

Slurry preparation

Ensure that the resin is washed thoroughly into the packing solution before starting the packing. Use a glass filter to wash the resin over to the packing solution. Suspend the resin by shaking and pour into the funnel and wash according to the following instructions:

1. Wash 5 times with 2 column volumes (CV) of packing solution. Gently stir with a plastic spatula between additions.
2. Pour the washed resin from the funnel into a beaker.
3. Add packing solution to obtain the indicated slurry concentration for specific resin and column type.

Use a packing tube

When packing HiScale, XK, and Tricorn, we recommend you use a packing connector together with an extra glass tube to serve as a packing reservoir (Fig 3). By using the packing tube, you can add the whole slurry volume in a single pouring. For detailed description on how to pack each column, we recommend that you download the column instructions document for the respective column types.

Test the efficiency of the packed column

Column efficiency testing plays a central role in the qualification and monitoring of packed bed performance. The desirable high column efficiency gives low band/peak broadening and is an indicator of how well packed the column is before starting purification.

Column efficiency is typically defined in terms of two parameters (Fig 4):

- Peak broadening over the column is described by an equivalent number of theoretical plates
- Peak symmetry is described by a peak asymmetry factor, A_s

The procedure is described in each Cytiva resin protocol and is also described in this Column efficiency testing application note [28937207](#).

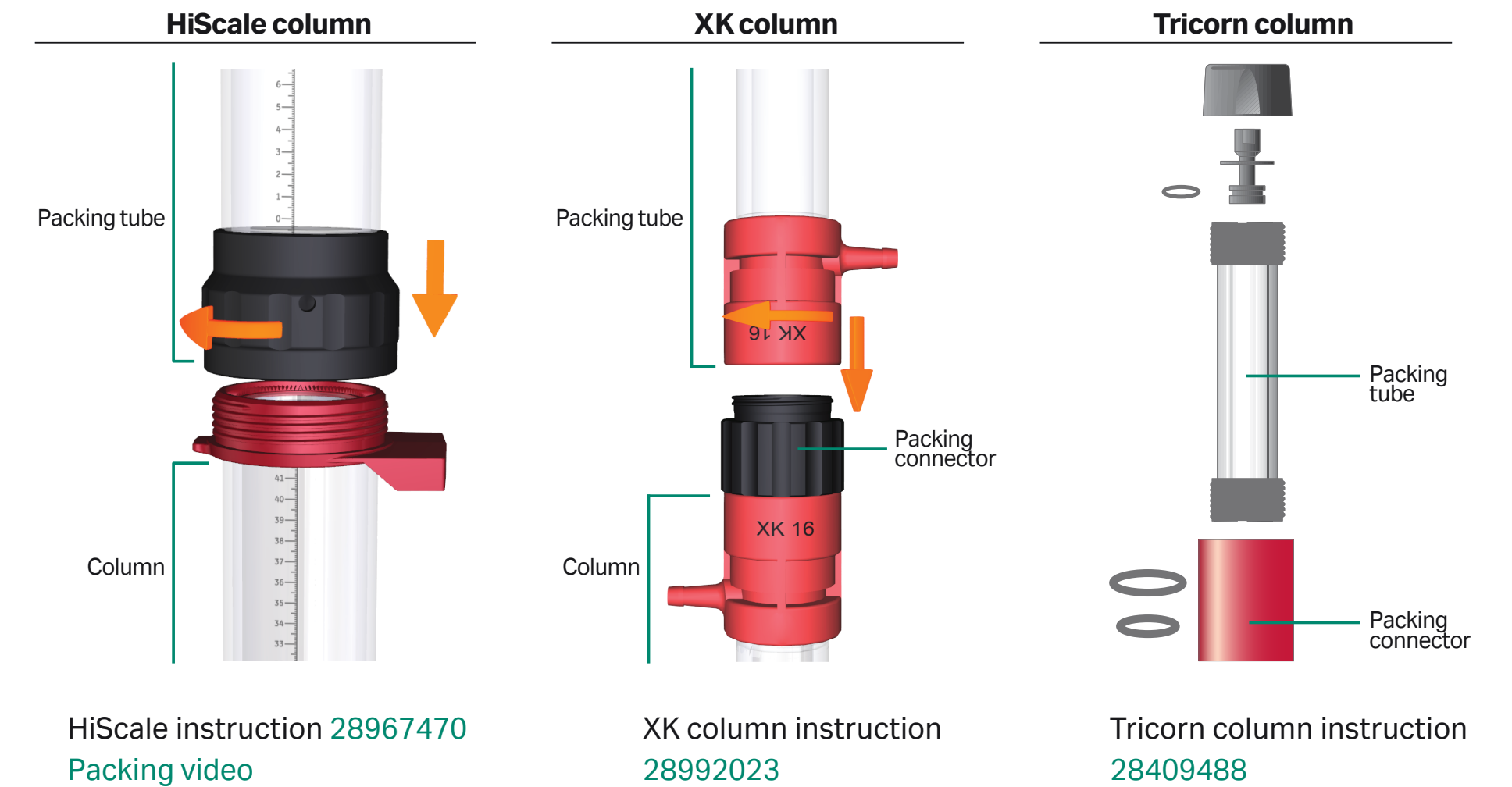


Fig 3. Connection of the packing tube for HiScale, XK, and Tricorn columns.

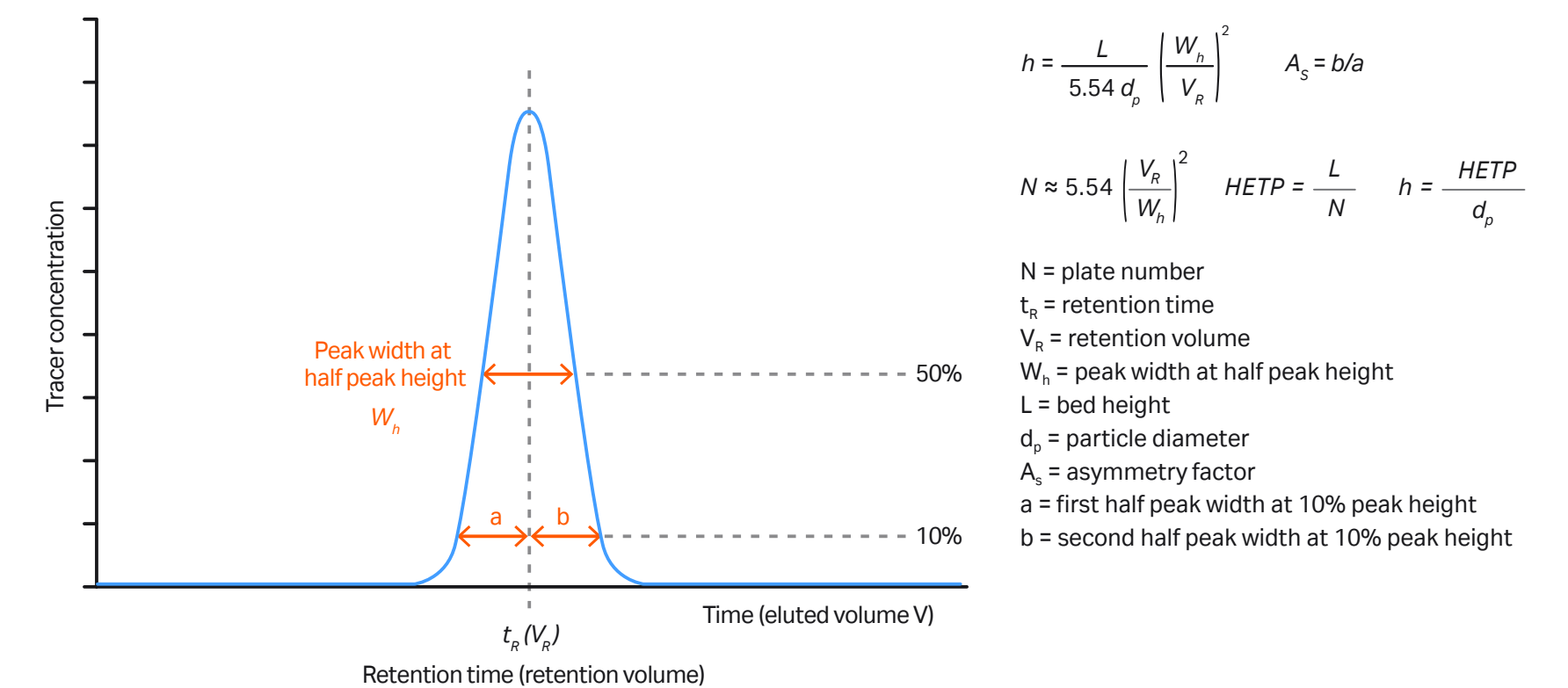


Fig 4. Determination of column efficiency by number of theoretical plates per meter (N/m) and peak asymmetry factor (A_s).

Not enough time to pack your own columns?

Packing a column can be both difficult and time-consuming and needs practice. For SEC, columns can take up to a full day to pack. For other techniques, packing can require over an hour (see figure).

Instead of spending hours of your time packing and testing your column before you can start to purify your protein, consider purchasing a manufactured prepacked column. This eliminates the need for repeated column packing and ensures that you have a well-packed column for immediate use.

If the prepacked column you need is not available as a regular product, contact our [Custom Products](#) group. We can customize columns and resins to your specific requirements.

	Packing your own columns		Buying a prepacked column
	SEC	HIC/IEX/AC	Various chromatography techniques
Prepare slurry	~ 1 h	5 min	-
▼			
Prepare column	15-30 min	15-30 min	-
▼			
Pack the column	1-4 h	~ 30 min	-
▼			
Test the column	45-120 min	30 min	-
Time until column is ready to use	3-7.5 h	60-90 min	Column ready to use!

Capto Q ImpRes, Capto SP ImpRes, and Capto S ImpAct

Packing parameters

Your parameters				Resin preparation		Column packing						Post-column packing	
Resin	Packed bed height (cm)	Column type	Bed volume (mL)	Slurry/packing solution	Slurry concentration (%)	Settling flow The flow that consolidates the resin suspension (slurry)		Packing flow The flow that compresses the bed		Compression Bed is further compressed by turning the adapter manually into the bed		Conditioning flow The flow to get a uniform bed over the entire column height	
						mL/min	cm/h	mL/min	cm/h	Mechanical compression packing factor (PF) ¹	Flow compression (mm)	mL/min	cm/h
Capto Q ImpRes Capto SP ImpRes Particle size d_{50v}^2 : 40 μm	10	Tricorn 5	2.0	10 mM NaCl	45–55	7.4	2250	7.4	2250	N/A	1	N/A	N/A
		Tricorn 10	7.9			29.4		29.4					
		HiScale 10	7.9	20% ethanol with 0.4 M NaCl	63	10.3	783	14.5	1108	1.05	N/A	14.5	1108
		XK 16 and HiScale 16	20.1	10 mM NaCl	45–55	40	1200	N/A	N/A	1.12		40	1200
		XK 26 and HiScale 26	53.1			106				1.12		106	
		XK 50 and HiScale 50	196.3			393				1.12		393	
	HiScale 10	15.7	20% ethanol with 0.4 M NaCl			63				10.3		783	
	20	XK 16 and HiScale 16	40.2	10 mM NaCl	45–55	33	1000	N/A	N/A	1.12		N/A	1000
		XK 26 and HiScale 26	106.1			88				1.12	88		
		XK 50 and HiScale 50	392.5			327				1.12	327		
	25	HiScale 10	19.6	20% ethanol with 0.4 M NaCl	63	10.3	783	14.5	1108	1.04	14.5	1108	
	35	XK 16 and HiScale 16	70.3	10 mM NaCl	45–55	23	700	N/A	N/A	1.09	700		
		XK 26 and HiScale 26	185.7			62				1.09		62	
		XK 50 and HiScale 50	686.9			229				1.09		229	
	Capto S ImpAct Particle size d_{50v}^2 : 50 μm	10	Tricorn 5	2.0	0.4 M NaCl	45–55	3.5	1070	3.5	1070	N/A	1	N/A
Tricorn 10			7.9	14			14						
XK 16 and HiScale 16			20.1	20% ethanol with 0.2 M sodium acetate	45–55	10	300	25	750	N/A	N/A	N/A	N/A
XK 26 and HiScale 26		53.1	27			53		600					
XK 50 and HiScale 50		196.3	98			196							
20		XK 16 and HiScale 16	40.2			7.4	220	16.7	500				
		XK 26 and HiScale 26	106.1			19		35	400				
		XK 50 and HiScale 50	392.5			72		98	300				
35		XK 16 and HiScale 16	70.3	3.3	100	8.4	250						
		XK 26 and HiScale 26	185.7	9		22							
		XK 50 and HiScale 50	686.9	33		65		200					

¹ The PF values in this table are specific for the lab-packing method used. The PF shown here bears no relation to the PF described for large-scale column packing procedures.

² d_{50v} = median particle size of the cumulative volume distribution.

Capto Q, Capto S, Capto DEAE, Capto Core 400, and Capto Heparin

Packing parameters

Your parameters				Resin preparation		Column packing						Post-column packing	
Resin	Packed bed height (cm)	Column type	Bed volume (mL)	Slurry/packing solution	Slurry concentration (%)	Settling flow The flow that consolidates the resin suspension (slurry)		Packing flow The flow that compresses the bed		Compression Bed is further compressed by turning the adapter manually into the bed		Conditioning flow The flow to get a uniform bed over the entire column height	
						mL/min	cm/h	mL/min	cm/h	Mechanical compression packing factor (PF) ²	Flow compression (mm)	mL/min	cm/h
Capto Q Capto S Particle size d_{50v} ³ : 90 μm	10	Tricorn 5	2.0	10 mM NaCl	40–60	1.8	540	9.8	3000	N/A	1	N/A	N/A
		Tricorn 10	7.9			7.1		39.3					
		XK 16 and HiScale 16	20.1			25		N/A				N/A	1.1
	XK 26 and HiScale 26	53.1	66	1.15	66								
	XK 50 and HiScale 50	196.3	250	1.15	250								
	20	XK 16 and HiScale 16	40.2	25	1.1	25							
		XK 26 and HiScale 26	106.1	66	1.1	66							
		XK 50 and HiScale 50	392.5	250	1.15	250							
	35	XK 16 and HiScale 16	70.3	25	1.06	14							
		XK 26 and HiScale 26	185.7	66	1.06	37							
		XK 50 and HiScale 50	686.9	250	1.1	140							
	Capto DEAE Capto Heparin¹ Capto Core 400¹ Particle size d_{50v} ³ : 90 μm	10	Tricorn 5	2.0	20% ethanol with 0.2 M NaCl	45–60	5	1500	5	1500	N/A	1	N/A
Tricorn 10			7.9	20			20						
XK 16 and HiScale 16			20.1	25			N/A		N/A				1.1
XK 26 and HiScale 26		53.1	66	1.15	66								
XK 50 and HiScale 50		196.3	250	1.15	250								
20		XK 16 and HiScale 16	40.2	25	1.1	25							
		XK 26 and HiScale 26	106.1	66	1.1	66							
		XK 50 and HiScale 50	392.5	250	1.15	250							
35		XK 16 and HiScale 16	70.3	25	1.06	14							
		XK 26 and HiScale 26	185.7	66	1.06	37							
		XK 50 and HiScale 50	686.9	250	1.1	140							

¹ Part of the CDM program from Cytiva. Packing protocols for CDM-developed resins are not verified but are based on packing protocols for standard products having similar pressure-flow characteristics.

² The PF values in this table are specific for the lab-packing method used. The PF shown here bears no relation to the PF described for large-scale column packing procedures.

³ d_{50v} = median particle size of the cumulative volume distribution.

MabSelect Prisma and MabSelect

Packing parameters

Your parameters				Resin preparation		Column packing						Post-column packing										
Resin	Packed bed height (cm)	Column type	Bed volume (mL)	Slurry/packing solution	Slurry concentration (%)	Settling flow The flow that consolidates the resin suspension (slurry)		Packing flow The flow that compresses the bed		Compression Bed is further compressed by turning the adapter manually into the bed		Conditioning flow The flow to get a uniform bed over the entire column height										
						mL/min	cm/h	mL/min	cm/h	Mechanical compression packing factor (PF) ¹	Flow compression (mm)	mL/min	cm/h									
MabSelect Prisma Particle size d_{50v}^2 : 60 μm	10	Tricorn 5	2.0	20% ethanol with 0.2 M NaCl	45–55	1.96	600	1.96	600	N/A	1	N/A	N/A									
		Tricorn 10	7.9			7.85		7.85														
		HiScale 10	7.9	20% ethanol with 0.4 M NaCl	50	2.62	200	2.62	200	1.1	N/A	N/A	9.16	700								
		XK 16 and HiScale 16	20.1			6.7		6.7					1.12		16.8							
		XK 26 and HiScale 26	53.1			45–55		17.7					65.4	N/A	N/A	1.15	1.16	1.1	N/A	44.2	500	
		XK 50 and HiScale 50	196.3																	2.62		2.62
	HiScale 10	15.7	50			2.62		6.7					200	N/A	N/A	1.1	1.1	N/A	13.4	400		
	XK 16 and HiScale 16	40.2																	45–55		17.7	65.4
	XK 26 and HiScale 26	106.1		70	2.62		6.7		200	1.1	1.1	1.1								1.1		
	XK 50 and HiScale 50	392.5	45–55	17.7	65.4	N/A	N/A	1.1	1.1	1.1	N/A	7.7	230									
	25	HiScale 10										19.6		6.7	6.7	200	1.1	1.1	1.1	1.1	20.4	
	35	XK 16 and HiScale 16	70.3	185.7	686.9	45–55	17.7	65.4	N/A	N/A	1.1	1.1	75.3									
													XK 26 and HiScale 26	185.7	6.7	6.7	200	1.1	1.1	1.1	1.1	75.3
	MabSelect Particle size d_{50v}^2 : 85 μm	10	Tricorn 5	2.0	20% ethanol with 0.2 M NaCl	45–55	2.29	700	2.29	700	N/A	1	N/A	N/A								
Tricorn 10			7.9	9.16			9.16															
XK 16 and HiScale 16			20.1	20% ethanol with 0.4 M NaCl	45–55	10	300	N/A	N/A	1.1	N/A	N/A	25	750								
XK 26 and HiScale 26			53.1			27							27		1.15	26						
XK 50 and HiScale 50			196.3			100							100	1.15	250							
XK 16 and HiScale 16			40.2			10							10	1.1	15							
XK 26 and HiScale 26		106.1	27			27							1.13	40								
XK 50 and HiScale 50		392.5	100			100							1.1	150								
35		XK 16 and HiScale 16	70.3	185.7	686.9	45–55	17.7	65.4	N/A	N/A	1.06	1.1	8.6	260								
													XK 26 and HiScale 26		185.7	27	27	1.1	23			
XK 50 and HiScale 50		686.9	100	100	1.06	86																

¹ The PF values in this table are specific for the lab-packing method used. The PF shown here bears no relation to the PF described for large-scale column packing procedures.

² d_{50v} = median particle size of the cumulative volume distribution.

MabSelect Xtra, VIII Select, MabSelect SuRe, MabSelect SuRe LX, and Capto L

Packing parameters

Your parameters				Resin preparation		Column packing						Post-column packing						
Resin	Packed bed height (cm)	Column type	Bed volume (mL)	Slurry/packing solution	Slurry concentration (%)	Settling flow The flow that consolidates the resin suspension (slurry)		Packing flow The flow that compresses the bed		Compression Bed is further compressed by turning the adapter manually into the bed		Conditioning flow The flow to get a uniform bed over the entire column height						
						mL/min	cm/h	mL/min	cm/h	Mechanical compression packing factor (PF) ²	Flow compression (mm)	mL/min	cm/h					
MabSelect Xtra VIII Select ¹ Particle size d _{50v} ³ : 75 µm	10	Tricorn 5	2.0	0.2 M NaCl	25–50	0.5	150	3	900	N/A	1	N/A	N/A					
		Tricorn 10	7.9			2		12				N/A	N/A					
		XK 16 and HiScale 16	20.1			10		1.1				25	750					
	XK 26 and HiScale 26	53.1	27	1.15	66													
	20	XK 50 and HiScale 50	196.3	100	1.15	250												
		XK 16 and HiScale 16	40.2	10	1.1	15	450											
		XK 26 and HiScale 26	106.1	27	1.13	40												
	XK 50 and HiScale 50	392.5	100	1.15	150													
	35	XK 16 and HiScale 16	70.3	10	1.06	8.6	260											
		XK 26 and HiScale 26	185.7	27	1.1	23												
		XK 50 and HiScale 50	686.9	100	1.06	86												
	MabSelect SuRe MabSelect SuRe LX Capto L Particle size d _{50v} ³ : 90 µm	10	Tricorn 5	2.0	20% ethanol with 0.2 M NaCl	45–55	2.29	700	2.29	700	N/A	1	N/A	N/A				
Tricorn 10			7.9	9.16			9.16		N/A				N/A					
HiScale 10			7.9	16			1222		16				1222	1.0	N/A	16	1222	
20		XK 16 and HiScale 16	20.1	20% ethanol with 0.4 M NaCl	45–55	10	300	N/A	N/A	1.1	N/A	25	750					
		XK 26 and HiScale 26	53.1			27						1.15		66				
		XK 50 and HiScale 50	196.3			100						1.15		250				
25		HiScale 10	15.7	20% ethanol with 0.4 M NaCl	45–55	16	1222	16	1222	1.0	N/A	16	1222					
		XK 16 and HiScale 16	40.2			10						1.1		15				
		XK 26 and HiScale 26	106.1			27						1.13		40				
35		XK 50 and HiScale 50	392.5	20% ethanol with 0.4 M NaCl	45–55	100	300	N/A	N/A	1.1	N/A	150	260					
		HiScale 10	19.6			14						1070		14	1070	1.0	14	1070
		XK 16 and HiScale 16	70.3			10						1.06		8.6				
35		XK 26 and HiScale 26	185.7	20% ethanol with 0.4 M NaCl	45–55	27	300	N/A	N/A	1.1	N/A	23	260					
		XK 50 and HiScale 50	686.9			100						1.06		86				

¹ Part of the CDM program from Cytiva. Packing protocols for CDM-developed resins are not verified but are based on packing protocols for standard products having similar pressure-flow characteristics.

² The PF values in this table are specific for the lab-packing method used. The PF shown here bears no relation to the PF described for large-scale column packing procedures.

³ d_{50v} = median particle size of the cumulative volume distribution.

Capto Core 700 and Capto MMC

Packing parameters

Your parameters				Resin preparation		Column packing						Post-column packing			
Resin	Packed bed height (cm)	Column type	Bed volume (mL)	Slurry/packing solution	Slurry concentration (%)	Settling flow The flow that consolidates the resin suspension (slurry)		Packing flow The flow that compresses the bed		Compression Bed is further compressed by turning the adapter manually into the bed		Conditioning flow The flow to get a uniform bed over the entire column height			
						mL/min	cm/h	mL/min	cm/h	Mechanical compression packing factor (PF) ¹	Flow compression (mm)	mL/min	cm/h		
Capto Core 700 Particle size d_{50v}^2 : 85 μm	10	Tricorn 5	2.0	20% ethanol with 0.2 M NaCl	45–55	2.29	700	2.29	700	N/A	1	N/A	N/A		
		Tricorn 10	7.9			9.16		9.16							
		XK 16 and HiScale 16	20.1			10		1.15						25	
			XK 26 and HiScale 26	53.1			27	1.15	66	750					
			XK 50 and HiScale 50	196.3			100	1.15	250						
	20	XK 16 and HiScale 16	40.2	20% ethanol with 0.4 M NaCl	45–55	10	300	N/A	N/A	N/A	N/A	15	450		
		XK 26 and HiScale 26	106.1			27								1.1	40
		XK 50 and HiScale 50	392.5			100								1.1	150
	35	XK 16 and HiScale 16	70.3			10					1.06	8.6	260		
		XK 26 and HiScale 26	185.7			27				1.06	23				
		XK 50 and HiScale 50	686.9			100				1.06	86				
	Capto MMC Particle size d_{50v}^2 : 75 μm	10	Tricorn 5	2.0	10 mM NaCl	40–60	1.8	540	9.8	3000	N/A	1	N/A	N/A	
Tricorn 10			7.9	7.1			39.3								
XK 16 and HiScale 16			20.1	25			1.1		25						
			XK 26 and HiScale 26	53.1			66	1.15	66	750					
			XK 50 and HiScale 50	196.3			250	1.15	250						
20		XK 16 and HiScale 16	40.2	20% ethanol with 0.4 M NaCl	45–55	25	750	N/A	N/A		N/A	N/A	25	420	
		XK 26 and HiScale 26	106.1			66				1.1					66
		XK 50 and HiScale 50	392.5			250				1.15					250
35		XK 16 and HiScale 16	70.3			25					1.02	14	420		
		XK 26 and HiScale 26	185.7			66				1.03	37				
		XK 50 and HiScale 50	686.9			250				1.03	140				

¹ The PF values in this table are specific for the lab-packing method used. The PF shown here bears no relation to the PF described for large-scale column packing procedures.

² d_{50v} = median particle size of the cumulative volume distribution.

Capto adhere and Capto adhere ImpRes

Packing parameters

Your parameters				Resin preparation		Column packing						Post-column packing		
Resin	Packed bed height (cm)	Column type	Bed volume (mL)	Slurry/packing solution	Slurry concentration (%)	Settling flow The flow that consolidates the resin suspension (slurry)		Packing flow The flow that compresses the bed		Compression Bed is further compressed by turning the adapter manually into the bed		Conditioning flow The flow to get a uniform bed over the entire column height		
						mL/min	cm/h	mL/min	cm/h	Mechanical compression packing factor (PF) ¹	Flow compression (mm)	mL/min	cm/h	
Capto adhere Particle size d_{50v}^2 : 75 μm	10	Tricorn 5	2.0	10 mM NaCl	40-60	0.25	76	10	3000	N/A	1	N/A	N/A	
		Tricorn 10	7.9			1		40						
		HiScale 10	7.9	20% ethanol with 0.4 M NaCl	60	20	1528	20	1528	1.0	N/A	20	1528	
		XK 16 and HiScale 16	20.1	20% ethanol with 0.4 M NaCl	45-55	25	750	N/A	N/A	1.1	N/A	25	750	
		XK 26 and HiScale 26	53.1			66				1.15		66		
		XK 50 and HiScale 50	196.3			250				1.15		250		
	HiScale 10	15.7	20			1528				20		1528		1.0
	20	XK 16 and HiScale 16	40.2	20% ethanol with 0.4 M NaCl	45-55	25	750	N/A	N/A	1.1	N/A	25	750	
		XK 26 and HiScale 26	106.1			66				1.1		66		
		XK 50 and HiScale 50	392.5			250				1.15		250		
		HiScale 10	19.6			20				1528		20		1528
	35	XK 16 and HiScale 16	70.3	20% ethanol with 0.4 M NaCl	45-55	25	750	N/A	N/A	1.02	N/A	14	420	
		XK 26 and HiScale 26	185.7			66				1.03		37		
		XK 50 and HiScale 50	686.9			250				1.03		140		
	Capto adhere ImpRes Particle size d_{50v}^2 : 40 μm	10	Tricorn 5	2.0	10 mM NaCl	45-55	7.4	2250	7.4	2250	N/A	1	N/A	N/A
			Tricorn 10	7.9			29.4		29.4					
HiScale 10			7.9	20% ethanol with 0.4 M NaCl	63	10.3	783	14.5	1108	1.05	N/A	14.5	1108	
XK 16 and HiScale 16			20.1			20				1.12		20		
XK 26 and HiScale 26			53.1			53				1.12		53		
XK 50 and HiScale 50			196.3			196				1.12		196		
20		HiScale 10	15.7	20% ethanol with 0.4 M NaCl	63	10.3	783	14.5	1108	1.05	N/A	14.5	1108	
		XK 16 and HiScale 16	40.2			17				1.12		17		
		XK 26 and HiScale 26	106.1			44				1.12		44		
		XK 50 and HiScale 50	392.5			164				1.12		164		
25		HiScale 10	19.6	20% ethanol with 0.4 M NaCl	63	10.3	783	14.5	1108	1.05	N/A	14.5	1108	
		XK 16 and HiScale 16	70.3			12				1.09		12		
		XK 26 and HiScale 26	185.7			31				1.09		31		
35		XK 50 and HiScale 50	686.9	20% ethanol with 0.4 M NaCl	45-55	115	350	N/A	N/A	1.09	N/A	115	350	
		XK 16 and HiScale 16	70.3			12				1.09		12		
		XK 26 and HiScale 26	185.7			31				1.09		31		

¹ The PF values in this table are specific for the lab-packing method used. The PF shown here bears no relation to the PF described for large-scale column packing procedures.

² d_{50v} = median particle size of the cumulative volume distribution.

Capto MMC ImpRes, Capto Phenyl ImpRes, and Capto Butyl ImpRes

Packing parameters

Your parameters				Resin preparation		Column packing						Post-column packing			
Resin	Packed bed height (cm)	Column type	Bed volume (mL)	Slurry/packing solution	Slurry concentration (%)	Settling flow The flow that consolidates the resin suspension (slurry)		Packing flow The flow that compresses the bed		Compression Bed is further compressed by turning the adapter manually into the bed		Conditioning flow The flow to get a uniform bed over the entire column height			
						mL/min	cm/h	mL/min	cm/h	Mechanical compression packing factor (PF) ²	Flow compression (mm)	mL/min	cm/h		
Capto MMC ImpRes Particle size d_{50}^3 : 40 μm	10	Tricorn 5	2.0	10 mM NaCl	45-55	7.5	2250	7.5	2250	N/A	1	N/A	N/A		
		Tricorn 10	7.9			29.4		29.4				N/A	N/A		
		XK 16 and HiScale 16	20.1			20		600				1.15	N/A	N/A	20
	XK 26 and HiScale 26	53.1	53	1.15	53										
	XK 50 and HiScale 50	196.3	196	1.15	196										
	20	XK 16 and HiScale 16	40.2	20% ethanol with 0.4 M NaCl	35-45	17	500	N/A	N/A	1.12	N/A	N/A	17	500	
		XK 26 and HiScale 26	106.1			44							1.12		44
		XK 50 and HiScale 50	392.5			164							1.12		164
	35	XK 16 and HiScale 16	70.3	20% ethanol with 0.4 M NaCl	35-45	12	350	N/A	N/A	1.09	N/A	N/A	12	350	
		XK 26 and HiScale 26	185.7			31							1.09		31
		XK 50 and HiScale 50	686.9			115							1.09		115
	Capto Phenyl ImpRes ¹ Capto Butyl ImpRes ¹ Particle size d_{50}^3 : 40 μm	10	Tricorn 5	2.0	20% ethanol	45-55	3.8	1125	3.8	1125	N/A	1	N/A	N/A	
Tricorn 10			7.9	14.7			14.7		N/A				N/A		
HiScale 10			7.9	10.3			783		16				1222	1.05	N/A
20		XK 16 and HiScale 16	20.1	20% ethanol	45-55	20	600	N/A	N/A	1.15	N/A	N/A	20	600	
		XK 26 and HiScale 26	53.1			53							1.15		53
		XK 50 and HiScale 50	196.3			196							1.15		196
25		HiScale 10	15.7	20% ethanol with 0.4 M NaCl	63	10.3	783	16	1222	1.05	N/A	N/A	16	1222	
		XK 16 and HiScale 16	40.2			17	500	N/A	N/A	1.12			17	500	
		XK 26 and HiScale 26	106.1			44				1.12			44		
XK 50 and HiScale 50		392.5	164	1.12	164										
35		HiScale 10	19.6	20% ethanol with 0.4 M NaCl	63	10.3	783	14	1070	1.05	N/A	N/A	14	1070	
		XK 16 and HiScale 16	70.3			12	350	N/A	N/A	1.09			12	350	
	XK 26 and HiScale 26	185.7	31			1.09				31					
XK 50 and HiScale 50	686.9	115	1.09	115											

¹ Part of the CDM program from Cytiva. Packing protocols for CDM-developed resins are not verified but are based on packing protocols for standard products having similar pressure-flow characteristics.

² The PF values in this table are specific for the lab-packing method used. The PF shown here bears no relation to the PF described for large-scale column packing procedures.

³ d_{50}^3 = median particle size of the cumulative volume distribution.

Capto Phenyl (High Sub), Capto Butyl, Capto Octyl, KappaSelect, LambdaFabSelect, IgSelect, Alpha-1-Antitrypsin Select, Capto Chelating, Capto Blue, Capto Blue (High Sub), CaptoDeVirs, and VII Select

Packing parameters

Your parameters				Resin preparation		Column packing						Post-column packing	
Resin	Packed bed height (cm)	Column type	Bed volume (mL)	Slurry/packing solution	Slurry concentration (%)	Settling flow The flow that consolidates the resin suspension (slurry)		Packing flow The flow that compresses the bed		Compression Bed is further compressed by turning the adapter manually into the bed		Conditioning flow The flow to get a uniform bed over the entire column height	
						mL/min	cm/h	mL/min	cm/h	Mechanical compression packing factor (PF) ²	Flow compression (mm)	mL/min	cm/h
Capto Phenyl (High Sub)	10	Tricorn 5	2.0	20% ethanol with 0.2 M NaCl	45–55	1	300			1.05		2	600
Capto Butyl		Tricorn 10	7.9			4				1.08		8	
Capto Octyl¹		XK 16 and HiScale 16	20.1			25				1.1		25	
KappaSelect¹	10	XK 26 and HiScale 26	53.1			66			1.15		66	750	
LambdaFabSelect¹		XK 50 and HiScale 50	196.3			250			1.15		250		
IgSelect¹		XK 16 and HiScale 16	40.2			25			1.1		25		
Alpha-1-Antitrypsin Select¹	20	XK 26 and HiScale 26	106.1	20% ethanol with 0.4 M NaCl	45–55	66	750	N/A	N/A	1.1	N/A	66	
Capto Chelating¹		XK 50 and HiScale 50	392.5			250				1.15		250	
Capto Blue		XK 16 and HiScale 16	70.3			25				1.02		14	
Capto Blue (High Sub)¹	35	XK 26 and HiScale 26	185.7			66			1.03		37	420	
CaptoDeVirs¹		XK 50 and HiScale 50	686.9			250			1.03		140		
VII Select¹		Particle size d_{50v} ³ : 75 μm											

¹ Part of the CDM program from Cytiva. Packing protocols for CDM-developed resins are not verified but are based on packing protocols for standard products having similar pressure-flow characteristics.

² The PF values in this table are specific for the lab-packing method used. The PF shown here bears no relation to the PF described for large-scale column packing procedures.

³ d_{50v} = median particle size of the cumulative volume distribution.

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